

Chapter Seven

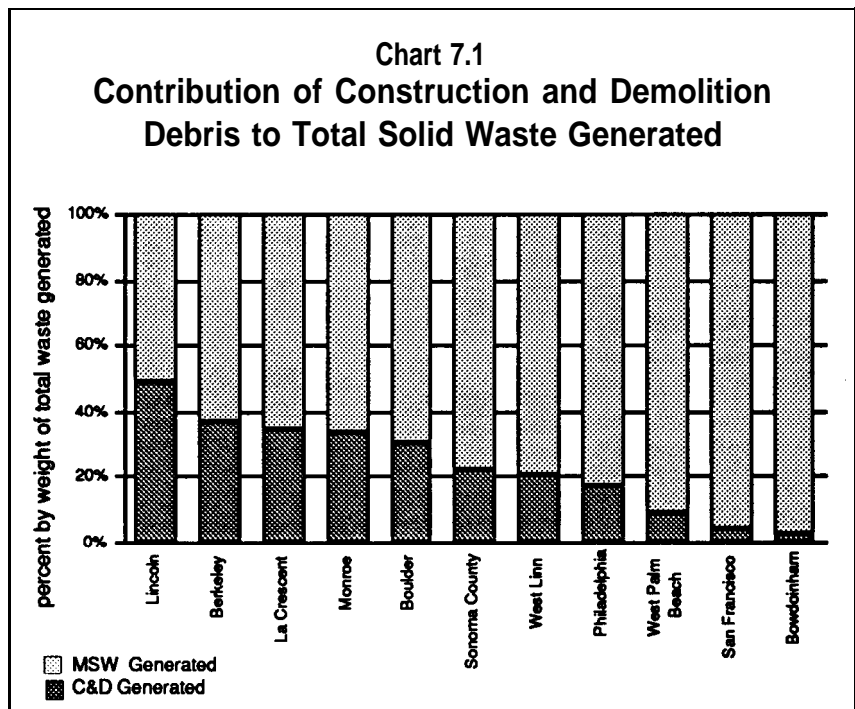
Targeting Construction and Demolition Debris for Recovery

Construction and demolition (C&D) debris is waste generated as a result of building activities, including road repair projects. This waste includes tree stumps and other treated and untreated wood waste, bricks, concrete, asphalt, metal, roofing shingles, dry wall, and other building materials. The amount of C&D debris any given community generates may fluctuate widely from year to year as land clearing, construction, and demolition activities vary over time. C&D often comprises a significant portion of the total solid waste generated by many communities. While this waste often burdens local collection and disposal systems, much of it is handled by the private sector; as a consequence, tonnages generated are often untracked and therefore unknown.¹

Chart 7.1, which compares the amount of C&D waste generated to the amount of municipal solid waste generated for select communities, illustrates how much C&D debris generation can vary among communities. (C&D waste is neither household nor commercial/institutional waste. Thus the tonnages of MSW generated and recovered in this report do not include C&D waste. C&D waste is, however, included in total solid waste tonnages. See Table 2.2.) In the rural community of Bowdoinham, Maine, C&D debris made up 2 percent of the local waste stream in fiscal year 1990, or 0.01 tons per capita. In comparison, C&D totaled 1.07 tons per capita in the City of Lincoln, Nebraska in 1990—nearly 50 percent of the total waste stream. As a result of major street repair work in 1989,

the rural city of Monroe, Wisconsin, also generated a large amount of C&D waste, equivalent to 0.60 tons per person.

Table 7.1 provides C&D waste generation and recovery data for 13 communities (all those in our study for which such information was available), including which materials are reclaimed. Chart 7.2 shows the significant contribution recovery of C&D materials makes to the total solid waste recovery rate in Monroe, Wisconsin; Lincoln, Nebraska; La Crescent, Minnesota; and Berkeley, California. In our base year of study, the annual tonnage of C&D materials recovered in these communities exceeded that of MSW recovered. (See Tables 2.1 and 7.1.) In fact, if the tonnage of C&D recovered is excluded from total waste recovered and disposed, recovery rates would drop from 38 percent to 22 percent in Berkeley, from 41 percent to 29 percent in La



Crescent, from 52 percent to 12 percent in Lincoln, and from 50 percent to 28 percent in Monroe.

Asphalt and concrete are currently the most popular C&D materials being recovered. Some communities recycle and/or compost wood waste, and a few are recovering other C&D materials through public or private operations. This chapter describes C&D recovery strategies employed in these communities. These include:

- salvaging bricks, wood waste, and other discarded building materials for reuse,
- grinding asphalt, concrete, and bricks for use as an aggregate, primarily in new roadbed construction, or as landfill cover,
- recovering asphalt roofing waste for recycling into a road repair asphalt material,
- recovering scrap metal for remanufacturing,
- grinding wood waste into a mulch product, and
- using C&D for fill or landfill cover.

Materials Exchange for resale to local homeowners and builders. In its 1991 fiscal year, Urban Ore grossed \$724,364 (\$134 per ton recovered) from the salvage and resale of C&D debris and other household materials, earning a net profit of \$27,754.

The Loading Dock, a nonprofit building supply recycler located in Baltimore, Maryland, redirects bulky material such as lumber, drywall, floor covering, doors, paints, and windows from disposal to end uses. Donated materials must be reusable. The Loading Dock distributes these materials to organizations that use them to build low-income housing. The operation currently recycles 12,000 to 14,000 tons of materials per year.

The Town of Peterborough, New Hampshire recovers an untracked amount of bulky items, such as lumber, windows, and wire, at its Recycling Center, and gives these away to residents. According to the Town Administrator, the Recycling Center has gained a reputation as a place to find hard-to-obtain items. (See Chapter 3 for further discussion of reuse operations.)

Reuse Operations

In a few communities, public and private operations recover a wide range of materials from construction and demolition projects, including windows, doors, wood waste, and shingles, for reuse by professional contractors and “do-it-yourselfers.” Of the nearly 40,000 tons of C&D debris recovered in Berkeley, California from July 1990 through June 1991 (66 percent of C&D waste generated), an estimated 3,590 tons were salvaged by Urban Ore, a Berkeley-based company. That year, the company salvaged 27 percent of the 12,325 tons of wood waste generated in Berkeley. Urban Ore recovers used building materials, such as windows and doors, at its Building

Chart 7.2
Construction & Demolition Debris
and MSW Recovery

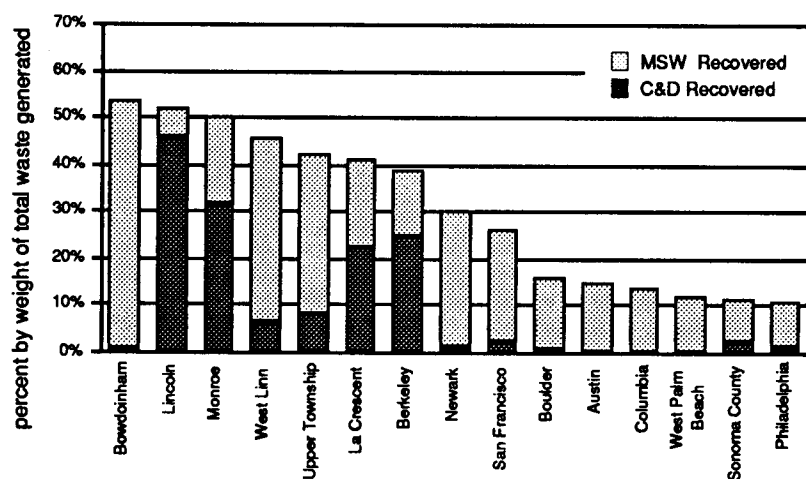


Table 7.1
Construction & Demolition Debris Recovery (a)

Community	Population	Year Data Applicable	C&D Generated (Tons)	Per Capita Generation (Tons/Year)	C&D Recycled (Tons)	C&D Composted (Tons)	C&D Recovered (Tons)	% C&D Recovered (By Wt.)	C&D Materials Recovered	C&D End Use
Berkeley, CA	102,724	FY91	59,626	0.58	39,593	0	39,593	66%	ASP, BLD, C&D	RB, BLD
Boulder, CO	88,000	1990	26,766	0.30	342	0	342	1%	SM, X	NA
Bowdoinham, ME	2,189	FY1990	12	0.01	(b)	0	(b)	(b)	C&D	BLD
La Crescent, MN	4,305	1990	919	0.21	600	0	600	65%	ASP	RB
Lincoln, NE	191,972	1990	206,146	1.07	193,167 (c)	0	193,167	94%	ASP, CON	LC, RB
Lincoln, Park, NJ	11,000	1990	NA	NA	522	83	604	NA	ASP, WW	NA
Monroe, WI	10,220	1989	6,142	0.60	5,875	0	5,875	96%	ASP	RB
Newark, NJ	275,221	1989	NA	NA	1,873	1,726	3,599	NA (d)	ASP, WW	NA
Philadelphia, PA	1,633,826	FY1990	431,684	0.26	19,088	4,500	23,588	5%	ASP, CON, C&D, WW	RB, LS
San Francisco, CA	723,959	1990	27,504	0.04	12,428	0	12,428	45%	ASP, CON	RB
Sonoma County, CA	388,222	1990	131,501	0.34	14,089	515	14,604	11%	ASP, CON, WW	NA
Upper Township, NJ	10,861	1990	NA	NA	0	766	766	NA (d)	WW	RB
West Linn, OR	1,977	1990	1,977	0.12	593	0	593	30%	C&D	NA
West Palm Beach, FL	62,530	4/90-3/91	132,684	2.12	0	0	0	0%	None	(e)

Key:

ASP = Asphalt

BLD = Building Materials

C&D = Undifferentiated C&D (including cinder blocks and brick)

CON = Concrete

LC = Landfill Cover

LS = Landscaping Material

NA = Not Available

RB = Roadbase

SM = Scrap Metal

WW = Wood Waste

X = Carpet Pads

Notes:

(a) Most communities do not track tonnages of C&D generated and recovered. We obtained most of our tonnage data from the private sector and disposal facilities. Our figures may exclude some C&D waste privately disposed or recovered. Other cities that recover C&D but do not track C&D tons generated include Berlin Township, Dakota County, Naperville, Peterborough, and Seattle. Although C&D tonnages in Naperville were not available, ILSR estimated, using a County figure, that the City generated 35,826 tons of C&D in 1990. In 1990 the City asphalt paving recycling program recycled an estimated 10,247 tons of asphalt.

(b) Bowdoinham recycled less than 1 percent (less than 1 ton) of its C&D debris.

(c) 133,167 tons, 69 percent of C&D waste recovered, were used as a landfill cover.

(d) The percentage of C&D waste recovered cannot be calculated, as C&D waste disposed is not available.

(e) Although no C&D was recovered in West Palm Beach during 1990, the County Solid Waste Authority recovers some C&D waste such as large cement pipes which are used to form artificial reefs.

Asphalt and Concrete Recovery

Rubble such as concrete, bricks, dirt, and asphalt is a common component of C&D waste. A number of municipalities reprocess and reuse asphalt and concrete from city street and sidewalk repair projects. Using reclaimed materials avoids disposal fees, and reduces the expense of producing and buying paving materials. New asphalt sells for approximately \$30 per ton (in 1991 dollars) in the Northeast, whereas recycled asphalt sells for \$5 to \$10 per ton.²

Asphalt used for paving roads actually contains 95 percent aggregate and only 5 percent pure asphalt. When roads are built, gravel is first laid and then covered with roadbase material. The roadbase, termed "cold mix," typically includes a mixture of crushed asphalt, aggregate, and stone. This layer is then covered with a protective coating, or "hot mix." Most waste asphalt is generated when existing paved areas are prepared for repaving; this involves removing the top layer of the old asphalt before replacing it with new asphalt. Some of the old asphalt can be mixed with new asphalt before being applied to the road surface. However, recycled asphalt is more often used as a roadbase or for shoulders on roads. With the improvement of technologies and the strengthening of secondary asphalt materials, the use of recycled asphalt in the top layer could increase in the future.³

Concrete waste, another component of C&D rubble, is a byproduct of sidewalk construction and repair, foundation pouring, and bridge building and repair. "Concrete" is actually a combination of concrete and an aggregate that contains crushed stone, sometimes mixed with sand and grit. Crushed concrete is primarily used as an aggregate for roadbase material. It can also be used for many other purposes, such as foundations or the concrete layer used below the cold and hot mixes on highway bridges. Reclaimed asphalt and concrete can be reprocessed at the construction site where they are generated or at a separate facility.⁴

La Crescent, Minnesota; Monroe, Wisconsin; Lincoln, Nebraska; Naperville, Illinois; Berkeley, California; and Philadelphia, Pennsylvania reclaim asphalt and concrete materials. In 1990 La Crescent recovered 600 tons of asphalt (65 percent of C&D generated that year), which was ground and relaid.

Monroe repaired its street beds in 1989, and a local company reprocessed the resulting 5,875 tons of asphalt for use in relaying the road bed. MSW recovery activities diverted 19 percent of Monroe's solid waste in 1989; C&D recovery increased this diversion level to 50 percent. The City of Berkeley recovered about 60 percent of the approximately 40,000 tons of C&D debris generated between July 1990 to June 1991 through two private C&D recovery operations.

Wood Waste Recovery

Wood waste often comprises a significant portion of the total C&D debris recovered by a community. Often such wood waste is burned as a fuel. While this may be an appropriate end use for untreated wood, it is not considered recycling. Wood waste from land clearing and other construction and demolition activities can be chipped or ground for use as a mulch product. In 1990 Lincoln Park recovered 1,876 tons of wood stumps and logs, which were delivered to The Ox Stump Factory in Ledgewood, New Jersey, for composting/mulching. This tonnage represents 43 percent of the organic materials recovered in Lincoln Park that year. (Tonnages of C&D disposed are not available; thus, a C&D recovery rate cannot be calculated for Lincoln Park.) The Factory, which opened in 1989, accepts yard waste, brush, and tree stumps for a fee of \$8 per cubic yard. Another 83 tons of wood waste from the demolition of two houses were recovered and composted in Lincoln Park by the private sector. Berlin Township chips brush, tree stumps, and clean lumber on a small area of its public works yard with a Chipmore chipper. In 1990 the Township recovered 640 tons (almost 22 percent of the materials it composted or chipped) this way.

Lower Value Uses

While new construction projects may represent the highest value use for asphalt and concrete, some communities are diverting these and other materials to other kinds of projects. Palm Beach County uses clean concrete such as cement pipes to form artificial reefs. Of the 193,167 tons of construction and demolition debris recovered in Lincoln, Nebraska in 1990, 133,167 tons were put

to a low-value use as fill material to close the landfill. (The other 60,000 tons of concrete and asphalt were recovered by private haulers and used for road resurfacing or to make new asphalt.)

Economic Incentives and Legislative Initiatives

Some of the communities in our study use financial incentives in the form of reduced tipping fees to encourage haulers and businesses to separate C&D materials for recovery. If haulers can deliver the waste they collect to a private or public recovery facility at a lower cost than a disposal facility would charge, they will tend to do so. In April 1990, Cape May County, New Jersey, opened the Bulky Waste Sorting and Recycling Facility at its landfill site to separate out scrap metal, tires, commercial cardboard, bulky waste, and wood waste. The County normally charges a landfill tipping fee of \$83.50 per ton, which can be reduced to \$60 per ton if private haulers separate out clean wood waste. If more than 5 percent of the private haulers load contains unsorted recyclable materials (that is, recyclables mixed with trash), the County charges \$200 in addition to the tipping fee.

The City of Lincoln encourages private haulers to deposit construction and demolition materials at the City's old landfill by not charging them a tipping fee. In 1990 a total of 193,167 tons of C&D (94 percent of C&D generated) were recovered at this facility. Much of this material was used to close the landfill.

Dakota County has a few private C&D recovery operations. One such operation, SKB (a subsidiary of Carl Bolander & Sons), a C&D demolition landfill, charges \$4.50 per cubic yard for clean and mixed loads of C&D debris—eight times less than the charge to haulers at the local municipal solid waste landfills. SKB recovers stumps, pallets, and clean wood from demolition and construction sites, processes these materials into a mulch, and sells them to landscapers and residents. In 1990 the facility produced an estimated 20,000 tons of mulch. SKB also crushes concrete, brick, and stone on site into materials to be used as a road base. Reinforcing rods removed at the processing plant are sold as scrap metal.

Communities also use legislative initiatives to help spur C&D recovery. When Cherry Hill, New Jersey contracts with private companies to repair the roads, the contract stipulates that top asphalt be pulverized and used as a bottom layer on the same street. This process, called Pulverization Stabilization Layover, resulted in the recycling of 19,413 tons of asphalt in 1989.⁵ In order to encourage reclamation of C&D materials—estimated to constitute 17 percent of its solid waste stream—McHenry County, Illinois has proposed requiring developers to submit a construction material recovery plan as a condition for receiving a building permit ordinance. After construction is completed, the builder would have to document what materials and what tonnages were recovered before occupancy approval was issued:

Notes

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²Christine T. Donovan, "Construction and Demolition Waste Processing: New Solutions for an Old Problem," *Resource Recycling*, August 1991.

³Ibid.

⁴Ibid.

⁵Brenda Platt et al., *Beyond 40 Percent: Record-Setting Recycling and Composting Programs*, (Washington, D.C.: Institute for Local Self-Reliance, 1990).

⁶"C&D Targeted for Recovery," *BioCycle*, October 1991, p. 10.